DOCUMENT RESUME

ED 389 131 EC 304 417

AUTHOR Stokeld, Cheryl L.
TITLE The Adult Sequelae of a Childhood Diagnosis of Attention-Deficit/Hyperactivity Disorder: A Review of the Literature for the Past Decade.
PUB DATE May 95
NOTE 50p.; Doctoral Research Paper, Biola University.
PUB TYPE Information Analyses (070) -- Dissertations/Theses - Undetermined (040)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Adjustment (to Environment); Adults; Alcohol Abuse; *Antisocial Behavior; *Attention Deficit Disorders; Clinical Diagnosis; Drug Abuse; *Hyperactivity; *Incidence; Mental Disorders; Multiple Disabilities; Psychiatry; Psychopathology; Research Methodology; *Substance Abuse

ABSTRACT

This paper reviews literature on the adult outcomes for children diagnosed with attention deficit/hyperactivity disorder (AD/HD). It critiques methodological issues, including diagnostic definitions, research designs, sample characteristics, and assessment instruments. It examines the relationship of AD/HD to a variety of adult disorders and pathology, including: (1) impaired lifestyle functioning (continuance of AD/HD symptomology and educational or occupational problems); (2) substance abuse (alcohol and drugs); (3) social pathology (antisocial behavior, criminality, and pathological gambling); and (4) psychiatric symptoms (mood disorders, anxiety disorders, and antisocial personality disorder). The paper concludes that some individuals diagnosed with AD/HD in childhood continue to experience the full or partial syndrome in adulthood, tend to have lower educational and occupational status, have an increased risk for alcohol and substance abuse, and appear to be at greater risk for psychopathology. In particular, there seems to be a link between AD/HD in childhood and antisocial personality disorder in adulthood. (Contains 49 references.)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 389 131

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

THE ADULT SEQUELAE OF A CHILDHOOD DIAGNOSIS OF ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER: A REVIEW OF THE LITERATURE FOR THE PAST DECADE

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
C. Stokeld
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

A Doctoral Research Paper

Presented to

the Faculty of the Rosemead School of Psychology

Biola University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Psychology

by

Cheryl L. Stokeld

May, 1995

EC304417

BEST COPY AVAILABLE

Copyright © 1995 by Cheryl L. Stokeld

THE ADULT SEQUELAE OF A CHILDHOOD DIAGNOSIS OF
ATTENTION-DEFICIT/ HYPERACTIVITY DISORDER:
A REVIEW OF THE LITERATURE
FOR THE PAST DECADE

by

Cheryl L. Stokeld

APPROVED:

[signature] Date 10/4/95
First Reader

[signature] Date 10/9/95
Second Reader

APPROVED:

[signature]
Dean

10/9/95
Date

ABSTRACT

THE ADULT SEQUELAE OF A CHILDHOOD DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A REVIEW OF THE LITERATURE FOR THE PAST DECADE

by

Cheryl L. Stokeld

Relevant research for the last decade pertaining to the adult outcome of children diagnosed with Attention-Deficit/Hyperactivity Disorder (AD/HD) is reviewed. Methodological issues are critiqued, including diagnostic definitions, research designs, sample characteristics, and assessment instruments. Specific issues examined in the review include AD/HD and its relationship to a variety of adult disorders and pathology. Such disorders and pathology include: (1) impaired lifestyle functioning (continuance of AD/HD symptomology and educational/occupational problems); (2) substance abuse (alcohol and drugs); (3) social pathology (antisocial behavior, criminality, and pathological gambling); and (4) psychiatric symptoms (presence of comorbidity, mood disorders, anxiety disorders, and antisocial personality disorder). The results indicate that childhood AD/HD may predispose a percentage of such children to an increased risk of such adult disorders and pathology.

TABLE OF CONTENTS

PAGE

DOCTORAL RESEARCH PAPER

Introduction....1

Methodological Considerations....2

Definitions....3

Research Designs....5

Retrospective versus Prospective Studies....5

Controls....6

Attributes of the Sample....7

Assessment Methods....8

Impaired Lifestyle Functioning....9

Continuance of AD/HD Symptoms....9

Educational and Occupational Impairment....13

Substance Use and Abuse....16

Alcohol Use and Abuse....16

Drug Use and Abuse....20

Social Pathology....23

Antisocial Behaviors....23

Criminality....25

Pathological Gambling....26

Psychiatric Disorders....28

Multiple Diagnoses....28

Anxiety Disorders....29

Mood Disorders....30

Antisocial Personality Disorder....31

PAGE

Implications for Further Research....34
Conclusion....36
REFERENCES....38

THE ADULT SEQUELAE OF A CHILDHOOD DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A REVIEW OF THE LITERATURE FOR THE PAST DECADE

Introduction

The recognition of Attention-Deficit/Hyperactivity Disorder (AD/HD) in children has grown dramatically in the last decade. Indeed, the committee for the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (American Psychiatric Association [APA], 1994) reviewed existing literature and estimated that 3 to 5% of school-age children now meet the diagnostic criteria for Attention-Deficit/Hyperactivity Disorder.

Evidence is also becoming increasingly clear that the symptoms of Attention-Deficit/Hyperactivity Disorder persist into adult life for a subgroup of individuals diagnosed with the disorder in childhood. This support comes from both longitudinal studies of AD/HD children followed into adulthood and from studies of adults who are retrospectively diagnosed as having had AD/HD symptoms in childhood. Prior to the last decade, studies not only indicated that AD/HD symptoms continued into adulthood for some individuals, but also suggested that a significant proportion of these individuals were at risk for problems of (a) behavioral social skills deficits (Hechtman, Weiss, & Perlman, 1980), (b) attainment of less education (Morrison, 1980), (c) deficient cognitive strategies (Hopkins, 1979), (d) drug

abuse (Eyre, Rounsaville, & Kleber, 1982), (e) alcohol abuse (Goodwin, Schulsinger, Hermansen, Guze, & Winokur, 1975; Wood, Wender, & Reimherr, 1983), (f) antisocial behavior (Halle, Hesselbrock, & Hesselbrock, 1982), and even (g) psychosis (Morris, Escoll, & Wexler, 1956). While much progress has been made, there is still much to learn with regard to identifying possible adult sequelae of childhood AD/HD. One purpose of this review is to encourage further research and understanding of the adult sequelae of AD/HD, with the hope that it will aid in early prevention and treatment, as well as heighten clinical awareness, thereby aiding in the proper treatment of adults with AD/HD.

This paper will review prospective and retrospective studies on AD/HD in adulthood across the last decade. Areas of research to be examined are: impaired lifestyle functioning, adult substance use and abuse, social pathology, and, finally, psychiatric disorders. This review concludes with a discussion of suggestions for further research.

Methodological Considerations

Before reviewing research results, it is important that the methodology of researchers be carefully examined. This section will begin with definitions of key terms, followed by a general critique of the research designs, sample characteristics, and assessment instrumentation used in this body of literature. Such an examination should enable the reader to have discriminating judgment in applying the current research in the area of AD/HD in adults.

Definitions

A variety of terms have historically been attached to the disorder currently known as Attention-Deficit/Hyperactivity Disorder: Hyperkinetic Syndrome, Hyperactive Child Syndrome, Minimal Brain Dysfunction, and Minimal Cerebral Dysfunction. The DSM-III (APA, 1980) was the first to give diagnostic criteria to the disorder, dividing it into two general categories: Attention Deficit Disorder with Hyperactivity (ADDH) and Attention Deficit Disorder Without Hyperactivity (ADD). For a diagnosis of ADDH to be made, an individual had to show signs of disturbance in three areas: inattention, impulsivity, and hyperactivity. ADD as a category was intended for individuals who met all but the hyperactive component of ADDH. Attention Deficit Disorder could also be classified as Residual Type (ADD-RT), which was applied to individuals who had previously met the criteria for ADDH.

With the advent of the DSM-III-R (APA, 1987), Attention Deficit Disorder with Hyperactivity was re-defined as Attention Deficit Hyperactivity Disorder (ADHD) and the criteria were revised so that no single feature (i.e., inattention, impulsivity, or hyperactivity) was required to make the diagnosis. The DSM-III-R also deleted the term "Attention Deficit Disorder without Hyperactivity" stating that this diagnosis "was hardly ever made" (p. 411). ADDH and ADD were thus separated into two different disorders, as opposed to subgroups of one disorder. The category of Undifferentiated Attention-Deficit Disorder was added to describe attentional problems that were not symptoms of another disorder. Attention Deficit Disorder Residual Type was re-termed Attention Deficit Hyperactivity Disorder (Residual State)

and the DSM-III requirement that "signs of hyperactivity are no longer present" (p. 44) was corrected.

The DSM-IV (APA, 1994) integrated ADHD and Undifferentiated ADD into Attention Deficit/Hyperactivity Disorder (AD/HD), and described Attention-Deficit/Hyperactivity Disorder as "...a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (p. 78). In addition, the symptoms must have been present before the age of 7 and there must be impairment in at least two settings in the individual's life. The DSM-IV also provides three subtypes of AD/HD: Combined Type, Predominantly Inattentive Type, and Predominantly Hyperactive-Impulsive Type. This was done in order to allow the predominance of either attention problems or hyperactivity-impulsivity problems to be emphasized in the diagnosis.

In light of the changes in the definition and diagnostic criteria of the disorder throughout its history, a main area of methodological concern for research in this area is the inability to compare the construct of AD/HD across studies. The diagnostic criteria used by the studies in this review are often non-specific. In longitudinal studies where specific criteria were used, definitions between first assessment and follow-up may have changed, and this factor may impact test results. For instance, there are differences between the use of the terms ADDH and ADHD. ADHD is meant to portray a milder range of dysfunction than ADDH since it does not require impairment in all the domains (attention, impulse control, and motor activity). Further, many of the studies use the term hyperactivity rather than a specific diagnosis. This

inconsistency is reflective of the fact that longitudinal studies were often begun prior to the advent of current nomenclature. The terms overlap with respect to the construct they are trying to describe, yet they should not be considered the same. These definitional problems pose an obvious limitation to our ability to compare and draw conclusions from the research.

Research Designs

There are several important areas of methodological concern with regard to research designs used in this area of research. For instance, retrospective and prospective studies both have weaknesses inherent to their specific designs which impact the data obtained from them. Further, studies within this body of research often fail to include a control group or use control groups that do not provide for adequate comparisons.

Retrospective versus prospective studies. A key difficulty in any attempt to research the adult sequelae of a childhood disorder is the necessity of using prospective and retrospective data. Retrospective studies can be methodologically questionable since a diagnosis is often made from dated or incomplete records. Such studies may also be subject to distorted memories on the part of the parent or the adult subject. Yet, prospective studies (which represent most of the studies reviewed within this paper), while more methodologically sound, have the inherent difficulty of subject attrition. The highest rate of re-contact in these studies was 98% (Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993), while the lowest was 65% of the original sample (Weiss, Hechtman, Milroy, & Perlman, 1985). Too great of a loss of subjects at the time of follow-up may render the findings questionable and may introduce a skewed picture of the subject profile. Cox, Rutter, and Quinton

(1977) documented that subjects unavailable for the follow-up may be the most pathological members of the group. Hence, failure to have this information makes it difficult to make confident assumptions about the population of those with AD/HD.

With regard to prospective studies, the ability to compare studies can also be difficult in light of differences in subject age and length of time at follow-up. The follow-up studies reviewed in this paper varied from a follow-up of 5.7 years (Mannuzza, Klein, Bonagura, Konig, & Shenker, 1988) to as many as 20 years (Weiss et al., 1985). Studies with a short time period between initial assessment and follow-up leave open questions regarding long-term outcome results.

Controls. Some studies lack a matched control or comparison group. This deficit presents a limitation to the usefulness of the data. In this paper, three studies did not report the inclusion of a control group (Cadoret & Stewart, 1991; Klinteberg, Magnusson, & Schalling, 1989; Shekim, Asarnow, Hess, Zaucha, & Wheeler, 1990). Further, several prospective studies selected controls at a time later than when the probands were first assessed. This reduces the ability for original comparison information, and makes it difficult to comment about change over time. In addition, the ability to observe attrition in the control subjects is not possible.

Another problem is the use of "super-normal controls," or control subjects that are screened out if they have certain behavioral or emotional problems. For instance, Gualtieri, Ondrusek, and Finley (1985) conducted a retrospective study which eliminated control subjects with a history of medical, neurological, psychiatric, or developmental problems either in

childhood or adulthood. With regard to AD/HD, this limits the ability to show how probands are different from other psychiatric groups, not just normals. It also may mean that differences found between probands and normals are no more than a reflection of the differences that might be expected of a group with previous psychiatric problems and one with no such history. This method of control group selection may enhance the differences between probands and controls in an unnatural way.

Attributes of the Sample

The sample sizes in these studies range from 14 subjects (Carlton et al., 1987) to 103 subjects (Mannuzza et al., 1993). Small sample size in a study creates an obvious difficulty in attaining statistical significance, and limits generalizability of the data.

Another significant problem with several of the studies is the age of subjects they classify as adults. Mannuzza et al. (1991), Gittelman, Mannuzza, Shenker, and Bonagura (1985), Mannuzza, Klein, Bonagura, Konig, and Shenker (1988), Mannuzza, Klein, Konig, and Giampino (1989), Mannuzza, Klein and Addalli (1991), and Lambert-Eyestone (1991) all included subjects as young as 16 years old. A related difficulty with the present studies is that only three reported that they assessed adults (who showed hyperactivity in childhood) when they were past their early 30s. Hence, inferences about AD/HD in adulthood are limited due to use of teenage subjects and the lack of middle-aged and senior adults.

Among the studies of AD/HD in the last decade, there also is a dramatic overrepresentation of the use of males as subjects. Eleven of the studies reviewed did not include females in their data. The focus on males is

likely to be reflective of the greater prevalence of males with AD/HD and the attempt by researchers to obtain homogenous samples. Indeed, the DSM-IV (APA, 1994) reports that male-to-female ratios for the prevalence of AD/HD range from 4:1 to 9:1. However, the overrepresentation of male subjects in the samples may exaggerate the amount of conduct disorder and overt behavior problems reported among probands. Another key problem with the research is that a large majority of the studies in this paper tested only Caucasian subjects, while the others often did not even mention the ethnic composition of their study. The use of primarily Caucasian and male subjects can limit the generalizability of the research.

Assessment Methods

There are several key areas of methodological problems with regard to instrumentation among research studies in this area. For instance, some studies tended to vary in how and what instruments they used to assess subjects. Further, none of the prospective studies used the same measures at first assessment as at the time of follow-up. In addition, studies differed with respect to who completed the tests (i.e., parents, the subject, or the researcher). All of these factors can significantly limit the validity and reliability of the research as well as the ability to make comparisons between studies.

A vast majority of the studies utilized tests that were created by the authors conducting the studies (e.g., the Teenager or Young Adult Schedule [TOYS], the Parent Interview [PARI], the Attention Deficit Disorder with Hyperactivity -Residual State Self-Report Scale). These tests are lacking in empirical support and have not even been published (Murphy, Conoley, &

Impara [Eds.], 1994). Use of instrumentation that lacks reliability, validity and standardization renders the results of the studies much more tentative.

Impaired Life-style Functioning

As stated earlier, research prior to the last decade began to indicate that, for some individuals, AD/HD symptomology did not end with childhood, but often continued in a full or partial state into adulthood. The DSM-IV (APA, 1994) corroborates that a minority of individuals diagnosed with the disorder as children experience the full range of symptoms into adulthood, while others may retain only certain symptoms as adults (in which case a diagnosis of Attention-Deficit/Hyperactivity Disorder, In Partial Remission would be warranted). Current research supports the observation that AD/HD symptoms are experienced in a portion of adults who had a childhood diagnosis of AD/HD; additionally, other impairments are often present for many of these adults. In particular, these individuals may tend to have more educational difficulties, achieve less educational status, and have lessened occupational achievement.

Continuance of AD/HD Symptoms

A number of studies have linked a childhood diagnosis of AD/HD with full or partial AD/HD symptoms that continue throughout adulthood. For instance, Weiss et al. (1985) conducted a 15-year follow-up study to determine the adult outcomes of children who had been diagnosed as hyperactive. The probands had initially been assessed at the time they were 6-12 years old. At follow up, 63 of these subjects were evaluated as adults (ages 21-33) and compared with 41 matched normal controls. The subjects were evaluated

through a battery consisting of a semi-structured interview with a psychiatrist, the Schedule for Affective Disorders and Schizophrenia (SADS-L, Endicott & Spitzer, 1978), the Symptoms Check List 90 (SCL-90, Derogatis, 1975), and the California Psychological Inventory (CPI, Jough, 1975).

In the Weiss et al. study (1985), 66% ($p < .0001$) of the hyperactive subjects claimed to have experienced one or more symptoms of ADD (i.e., distractibility, impulsivity, poor concentration, explosiveness) in adulthood, whereas only 7% of controls ($p < .0001$) claimed to have these symptoms. Furthermore, significantly more hyperactives than controls (64% vs. 29%; $p < .01$) complained of feelings of restlessness. Psychiatrists completing the history and interview more often rated the hyperactives than controls (44% vs. 9.7%) to be visibly restless (e.g., making small muscle movements, changing positions frequently) during the interview. It should be noted, however, that this study reports much higher rates of continued symptomology than either the DSM-IV (APA, 1994) or the other studies reported in this paper.

In their replication of the previous research, Mannuzza et al. (1991) compared 88 adults (ages 16-21) diagnosed as hyperactive in childhood with 64 normal controls. These subjects were administered the TOYS (Mannuzza & Klein, 1987) and their parents were given the PARI, (Mannuzza & Klein, 1988). The researchers again found that a significant number (43%, $p \leq .001$) of those diagnosed as hyperactive in childhood continued to show full or partial hyperactivity in the 15-year follow-up.

Mannuzza et al. (1993) conducted a follow-up study on 91 white male adults (ages 23-30) who were diagnosed as hyperactive in childhood. One

hundred white male adults served as controls. The subjects were given the Schedule for the Assessment of Conduct, Hyperactivity, Anxiety, Mood, and Psychoactive Substances Interview (CHAMPS, Mannuzza & Klein, 1987). This interview covered DSM-III (APA, 1980) and DSM-III-R (APA, 1987) diagnoses of ADDH and ADHD. The study found that a DSM-III-R diagnosis of ADHD was found in 8% of probands versus only 1% of controls ($p \leq .05$). An additional 3% of the probands reported at least some continued ADHD symptoms ($p \leq .05$).

Gittelman et al. (1985) also conducted a longitudinal study to determine the long-term psychiatric status of children diagnosed as hyperactive in childhood. Their study included 101 males (ages 16-23) who had been diagnosed between the ages of 6 to 12 as hyperactive. They were compared with 100 normal controls at follow-up by means of a modified version of the NIMH Diagnostic Interview Schedule (DIS, Robins, Helzer, Croughan, & Ratcliff, 1981). Parents were given the Parent Interview (PARI, Mannuzza & Klein, 1988). The researchers found that a full syndrome of ADDH was diagnosed in 31% of probands as compared to only 3% of controls ($p < .001$). A residual form of ADDH (attention deficits and impulsivity) was found in 5% of probands and none of the controls ($p < .03$). Further, the co-occurrence of hyperactivity with one of the other symptoms of ADDH, impulsivity, or inattention was reported in 4% of the probands and only one of the controls ($p < .05$).

Gualtieri et al. (1985) conducted a retrospective study on 22 adult subjects (ages 18-38) who met DSM-III (APA, 1980) criteria for ADD-RT. The sample included 14 men and 8 women. These subjects had histories, as confirmed by

parents or medical and school records, of having ADD symptomology during their school years. Each of the subjects received a battery of specialized tests and interviews. The final results of the test batteries were compared in 12 ADD-RT subjects with 12 normal controls.

The study found that there were significant differences between the probands and controls on the measures of present ($p < .0005$) and past ($p < .0005$) symptoms of ADD. The authors suggested that there was a high correlation of ADD symptoms in adulthood with childhood symptoms of ADD. The study also found that measures of attention span ($p < .05$), fidgeting behavior ($p < .01$), soft signs of neurological impairment ($p < .01$), and minor physical anomalies ($p < .025$) were higher in the ADD-RT subjects than in controls. Yet, while the study found significant differences, it indicated that the level of impairment from residual symptoms was not severe. Only 36% of the ADD-RT subjects had experienced symptoms severe enough to require help from a psychiatrist. Further, current problems were disabling in only a small number of the subjects.

Lambert-Eyestone's study (1991) attempted, among other things, to determine the extent of ADHD in the male prison population, the background variables related to ADHD, and the course of ADHD over time in the prison population. The study sampled 103 male offenders (ages 16-64) at Utah State Prison. These subjects were compared to a control group of 51 male subjects. All subjects were given a Beck Depression Inventory (Beck, 1978) and questionnaires developed by Wender, Reimherr, and Wood (1981) on ADHD-R. In addition, each was given a semi-structured interview and administered the Hamilton Psychiatric Rating Scale of Depression and the

Attention Deficit Disorder-Residual Type Rating Scale (Wender et al., 1981). Further, the Conners Abbreviated Rating Scale (Conners, 1985) was mailed to a mother or significant other to assess childhood behavior. The study found that, among incarcerated individuals, there was a portion of those with childhood ADHD whose symptoms remit over time. Almost 7% of the inmate sample and 8% of those in the control sample experienced remittance of childhood ADHD symptoms. However, the majority continued to experience a persistent course of ADHD symptomology.

Other studies supported the continuance of certain symptoms of the syndrome (i.e., partial remission) in adulthood. Klinteberg et al. (1989) conducted a study aimed at investigating the long-term relationship between childhood hyperactivity and adult impulsivity. Their subjects were 86 males age 26-27. The subjects were rated in 3rd grade then, at the follow-up, on self-report measures. The association between childhood hyperactive behavior and adult impulsiveness was found to be significant ($r = .20$, $p < .04$). In sum, there appears to be support for the position that symptoms of the syndrome currently known as AD/HD continue into adulthood for a subset of those diagnosed in childhood. Among these individuals, the syndrome is experienced in either a full or partial state.

Educational and Occupational Impairment

Studies have indicated that, along with continued symptoms of an AD/HD-related syndrome, educational and occupational deficits may exist in adults originally diagnosed in childhood. Biederman et al. (1993) studied 84 adults (mean age = 38.9) who had a diagnosis of ADHD in childhood with a pre-existing study group of 207 ADHD children (mean age = 10.5), a non-

referred group of 36 adult relatives of children with ADHD who also had ADHD (mean age = 39.3), and a group of 140 adults without ADHD who were relatives of normal children (mean age = 39.0). These groups were compared in order to demonstrate similarities between childhood ADHD and adult ADHD with regard to patterns of psychiatric and cognitive profiles. The subjects were administered the Structured Clinical Interview for DSM-III-R (Spitzer, Williams, Gibbon, & First, 1990), supplemented with modules from the Schedule for Affective Disorders and Schizophrenia for School-Age Children--Epidemiologic (Orvaschel & Puig-Antich, 1987). Further, psychosocial functioning was assessed by means of the Global Assessment of Functioning Scale of the DSM-III-R (1 = worst, 90 = best; Spitzer, Williams, Gibbon, & First, 1990). Socioeconomic status (SES) was measured by means of the Hollingshead Four-Factor Index of Social Status (1 = highest, 4 = lowest; Hollingshead, 1975).

Compared to adults without ADHD, the two groups of adults with ADHD had experienced significantly higher rates of repeated grades. The study found that 27% ($p \leq .001$) of referred adults with ADHD and 28% ($p \leq .01$) of non-referred adults with ADHD (versus only 10% of adult controls) had been required to repeat a grade. In addition, 36% ($p \leq .001$) and 43% ($p \leq .001$) of the ADHD adults, versus only 12% of controls, had received tutoring during their school years. Further, 8% ($p \leq .001$) and 6% ($p \leq .01$) of the two groups of adults diagnosed with ADHD had received placement in special classes versus only .5% of controls.

As adults, the two groups with ADHD were found to have significantly lower SES. The referred adults with ADHD achieved a mean

SES ranking of 1.8 ($p \leq .001$) and the non-referred adults achieved a mean ranking of 1.9 ($p \leq .01$), both of which were significantly higher (i.e., rated as having a lower SES) than the controls' mean SES ranking of 1.5. The study also found that, compared with the adults without ADHD, the two adult groups with ADHD were found to have poorer scores on the Global Assessment of Functioning Scale (47.1 [$p \leq .001$] and 48.4 [$p \leq .001$] vs. 64.9 of controls).

Mannuzza et al. (1993) also found that probands had achieved significantly lower social class rankings than the controls (3.4 vs. 2.7, $p < .0001$). In addition, as with the study by Weiss et al. (1985), hyperactives were found to have less formal education than controls. Probands in the study were found to have completed less school than the controls by 2.5 years ($p < .0001$). Twenty-three percent of the probands, as opposed to 2% of the controls, had dropped out of school by the 11th grade ($p < .001$). Twelve percent of probands versus almost half of the controls had obtained a bachelor's degree or higher ($p < .001$). Though not significant, the researchers noted that only one proband (versus 8% of controls) achieved a graduate degree. Furthermore, with regard to occupational status, probands had lower occupational ratings than the control group (3.5 vs. 4.4, $p < .0001$). Finally, fewer probands held professional positions (e.g., lawyer, scientist, accountant) than controls (4% vs. 21%,
$p < .001$).

Deficits have been found even in adults diagnosed as having AD/HD symptoms in childhood but not in adulthood. Mannuzza, Klein, Bonagura, Konig, and Shenker (1988) conducted a study to determine the status of

hyperactives who did not have a mental disorder at the time of the follow-up study. Fifty-two probands (ages 16-23) and 80 controls were given the TOYS (Mannuzza & Klein, 1987) and parents were interviewed with the PARI (Mannuzza & Klein, 1988). The Mannuzza et al. study (1988) found that even those probands who were diagnosed as hyperactive in childhood but lacked a DSM-III (APA, 1980) diagnosis in adulthood had an increased risk of poor functioning in school both academically (37% vs. 11%, $p < .001$) and behaviorally (31% vs. 9%, $p < .001$). Hence, childhood symptoms of AD/HD may also contribute to future difficulties in the achievement of educational and occupational status.

Substance Use and Abuse

Substance use and abuse has long been posited to be a correlate of childhood AD/HD symptomology. Although research is equivocal, there appears to be some evidence for greater alcohol use and abuse in AD/HD adults. A possibly stronger, yet still disputed, link has been found between AD/HD symptoms and higher rates of adult drug use and abuse.

Alcohol Use and Abuse

A number of studies conducted within the last 10 years have linked childhood AD/HD with adult alcohol use and abuse. For instance, Shekim et al. (1990) conducted a study to report the demographic and diagnostic profile of 56 adult men and women (ages 19-65) who met the DSM-III-R (APA, 1987) criteria for ADDH. The subjects were diagnosed according to the Schedule for Affective Disorder and Schizophrenia--Lifetime Version (SADS-L, Endicott & Spitzer, 1978), the Symptoms Checklist-90 Revised (SCL-90R, Derogatis, 1975), the ADDH-RS Self-Report Scale (DSM-III-R criteria modified by Shekim), a

modified Structured Interview for ADDH Symptoms (Gittelman & Mannuzza, 1985), the Conners ADDH Self-Report Scale (Conners, 1985), and the Global Assessment Scale (GAF, Endicott, Spitzer, & Fleiss, 1976). In the study, 34% of the subjects were found to meet diagnostic criteria for alcohol abuse or dependence.

Biederman et al. (1993) also found a similar link between childhood ADHD and alcohol use and abuse in adulthood. Compared with an adult group without ADHD, two groups of adults with ADHD had significantly higher rates of alcohol use and abuse. The study found that 25% ($p \leq .001$) of referred adults with ADHD and 17% ($p \leq .001$) of non-referred adults with ADHD met the DSM-III-R (APA, 1987) criteria for alcohol abuse versus only 8% of the controls. Further, 27% ($p \leq .01$) of referred adults with ADHD and 36% ($p \leq .001$) of non-referred adults versus only 13% of the controls met the criteria for alcohol dependence.

Some research supports an association between severity of AD/HD symptoms in adulthood and increased risk for alcohol use and abuse. For instance, Greenfield, Hechtman, and Weiss (1988) analyzed data from a 15 year follow-up study which compared 61 hyperactives with 41 controls. This study attempted to explore the relationship between continuing symptoms of hyperactivity and outcome in adulthood. At follow-up, information on court and police involvement was obtained, and subjects were also assessed for drug use, presence of continuing symptoms, and emotional difficulties. These characteristics were measured by the Schedule for Affective Disorders and Schizophrenia (SADS, Endicott & Spitzer, 1978), California Psychological Inventory (CPI, Jough, 1975), and Symptoms Checklist-90 (SCL-90, Derogatis,

1975). The interrelation of outcome variables (continuing symptoms, antisocial behavior, substance use, and emotional problems) was examined to determine clustering. The outcome measures were rated on a scale (presented by Weiss and Hechtman, 1986) which categorized symptom severity.

From the hyperactive group, two subgroups were identified. One subgroup had moderate to severe continuing symptoms, while the other had mild or no continuing symptoms. No significant differences were found between the control group and probands without significant continuing ADDH symptomology. However, hyperactives with moderate to severe continuing ADDH symptoms had a significantly greater level of alcohol use and abuse ($p < .01$). Hence, the research suggests that there are subgroups of hyperactives as adults, one of which does not significantly differ from normals, the other with more moderate-severe symptoms which are correlated with a worse outcome with regard to alcohol use and abuse.

Other research proposes that ADD adults, unlike normals, may tend to move toward alcoholism rather than controlled drinking. Huessy and Howell (1985) conducted two studies (within the same article) to determine the relationship between alcoholism and childhood behavioral problems. In Study I, interviews were conducted on 369 adults who had or had not been identified in childhood as exhibiting ADD. At follow-up, subjects were given interviews structured around a 174-item protocol. The results of the study showed that there were no differences with regard to alcoholism between those diagnosed as ADD and those not diagnosed with ADD in childhood.

In Study II of the same article, the two groups (mean age = 21.9) from Study I were compared with 98 alcoholics (mean age = 35.7) who were in a residential alcohol treatment center. The adult alcoholics retrospectively reported childhood behavior through the use of a scale developed by the authors of the study--the Adult Scale of Attention Deficit Disorder (ASADD). This scale contained 20 dichotomous items describing ADD behaviors. The alcoholics were found to describe problems which closely resembled those of adults diagnosed as ADD in childhood. Nearly half of the alcoholic subjects reported higher levels of ADD related behaviors during childhood than did 95% of the normal group without a history of ADD. In explanation of the contrasting findings between Studies I and II, the authors concluded that, as ADD adults move from their 20s to their 30s, they become less able to control and restrict their drinking.

Unlike many studies which found a strong link between childhood AD/HD symptoms and alcohol use and abuse, Hechtman and Weiss (1986) found no significant relationship between the two. Their research was aimed at studying non-medical drug use, alcohol use, and antisocial behaviors. The study compared 61 adults, who were referred to a psychiatric clinic between ages 6 and 12 for hyperactivity at home and school, to 41 matched controls. Subjects were assessed at follow-up by means of the Symptom Checklist 90 (SCL-90, Derogatis, 1975) and the California Personality Inventory (CPI, Jough, 1975). There was a trend ($p < .08$) for more hyperactives to abuse alcohol when average use of alcohol in the previous year was assessed. However, the study found that there were no significant differences between controls and hyperactives with regard to alcohol use.

Therefore, though there is some evidence to suggest that AD/HD is linked to increased alcohol use and abuse, there does not seem to be a clear consensus that this is consistently the case. In addition, the prevalence of alcohol use and abuse appears to occur only in a subgroup of those diagnosed in childhood, and may be associated with moderator variables such as greater social, emotional, and psychological difficulties. It appears that more research is needed that focuses on the ways in which the two disorders are related.

Drug Use and Abuse

A number of recent studies also support a relationship between childhood AD/HD symptoms and later drug abuse. Gittelman, Mannuzza, Shenker, and Bonagura (1985) found that there was a prevalence of 12% of the probands who had a drug use disorder ($p < .02$). Further, although not significant, 28% of probands versus 18% of controls reported having at some time been dysfunctional due to drug or alcohol use ($p < .10$). Similarly, Shekim et al. (1990) conducted a study to report the demographic and diagnostic profile of 56 adult men and women (ages 19-65) who met the DSM-III-R (APA, 1987) criteria for ADHD. The study found that 30% of these subjects were diagnosed as being drug abusive or dependent.

Biederman et al. (1993) found evidence that two groups of adults with ADHD had significantly higher rates of drug use and abuse when compared with an adult group without ADHD. The study found that 20% ($p \leq .001$) of referred adults with ADHD and 19% ($p \leq .01$) of non-referred adults with ADHD met the DSM-III-R (APA, 1987) criteria for drug abuse (versus only 6% of the controls). Further, 18% ($p \leq .001$) of referred adults with ADHD and

17% ($p \leq .001$) of the non-referred adults with ADHD (versus only 6% of the controls) met the criteria for drug dependence.

Mannuzza et al. (1993) reported that 33% of the probands versus 16% ($p \leq .05$) of the controls in their study were found to have an ongoing psychiatric disorder (e.g., adult ADHD and antisocial personality disorder). A prevalent diagnosis among probands was nonalcoholic substance use disorders (16% vs. 4% in controls, $p < .01$). In addition, they found that probands who had at least one ADHD symptom in adulthood were seven times more likely to have an ongoing drug abuse problem than probands whose ADHD symptoms had remitted (70% vs. 23%, $p \leq .01$).

Lambert-Eyestone (1991) found that ADHD in a sample of incarcerated subjects was significantly related to substance use, with drug abuse being more prevalent than alcohol use ($p \leq .05$). The presence of ADHD in both childhood and adulthood was associated with drugs-related crime, a drug history according to prison documents, and substance use problems according to the interview data.

Even studies which controlled for environmental factors found an increased risk among ADHD adults for drug abuse. Mannuzza, Klein, and Addalli (1991) conducted a follow-up study on the outcome of 50 adult men diagnosed as hyperactive in childhood. By comparing the boys (now adults) with their non-hyperactive brothers, the study controlled for certain environmental factors (such as parental pathology and socioeconomic status). Their aim was to examine whether hyperactives had a higher rate of mental disorder in adulthood than their brothers. Subjects were assessed at follow-up by means of evaluations of mental status by subject and parent, the TOYS

(Mannuzza & Klein, 1988), and the PARI (Mannuzza & Klein, 1988). Of the subjects, nine probands, five siblings, and one control were diagnosed with a drug abuse problem. Although not significant, more probands (44%) were found to abuse multiple drugs than their brothers (20%) who reported having a drug use disorder.

Some studies have posited that antisocial disorders, which are proposed to be more prevalent among those with childhood AD/HD symptoms, account for the added risk of drug use in these individuals as adults. At 15-year follow-up, for instance, Mannuzza et al. (1991) found that the most prevalent diagnosis was ADD ($p \leq .001$), followed by antisocial/conduct disorder ($p \leq .01$), and drug use ($p \leq .01$). Yet the researchers found that, of those diagnosed as having both conduct and drug use disorders, the onset of antisocial/conduct disorder (ACD) occurred either before (79%) or concurrent with (21%) the onset of a substance use disorder. No subject reported a drug use disorder that began prior to an ACD.

Gittelman et al. (1985) similarly found that probands with the continued ADD syndrome were more likely than those who were in remittance (52% vs. 15%) to have either an antisocial or drug use disorder at the time of the follow up ($p < .001$). In addition, almost all cases (84%) of drug use disorder occurred among the probands who had an antisocial disorder ($p < .001$). Further, as with the previous study, the data indicated that an onset of conduct disorders was reported in all cases to either have preceded or coincided with the onset of a drug use disorder.

The findings with regard to childhood AD/HD and drug use and abuse do not find uniform support. For instance, Hechtman and Weiss (1986)

found that, while there was a trend ($p < .09$) for hyperactives to have tried heroin more often than controls, there were no additional significant differences with regard to non-medical drug use when hyperactives were compared to controls. Indeed, the study found that significantly more hyperactives than controls ($p < .02$) reported having intentionally stopped using any or all drugs in the previous 6 months to 3 years. Hence, as with alcohol use and abuse, there are some conflicting data with regard to the relationship between AD/HD and drug use and abuse. Overall, however, there appears to be at least a link, perhaps partly mediated by an antisocial or conduct disorder, between the two.

Social Pathology

A key question for children who experience AD/HD symptomology in childhood is whether they become more involved in socially pathological activities as adults. In particular, there is some evidence that these individuals engage more frequently in antisocial behaviors, have greater risk for criminality, and may engage in more pathological gambling than normals.

Antisocial Behaviors

Current research is tentative about the link between AD/HD symptomology in childhood and antisocial behaviors in adulthood. For instance, Hechtman and Weiss (1986) conducted a study which, in part, attempted to research differences among hyperactives versus controls with regard to antisocial behavior. The behaviors measured were number of court appearances, police involvement, and thefts. While the results were not significant, the study found a trend for more hyperactives to have appeared in

court for various offenses in comparison to control subjects ($p < .09$). In addition, while differences were also not significant, the number of court appearances was higher for hyperactives ($p < .07$). The only significant difference was that hyperactives had significantly more misdemeanor offenses ($p < .05$), a majority of which were for speeding. They also found that there was a non-significant trend for hyperactives to have problems with physical aggression in the three years prior to follow-up in comparison with controls (12 vs. 1, $p < .07$). In general, their study found that there were few significant differences with regard to controls and hyperactives who were engaged in antisocial behavior. When it did occur, however, the severity of antisocial behavior (which was measured by a Global Assessment Scale that categorized the behaviors into "Mild," "Moderate," and "Severe" categories) was found to be greater among hyperactives than controls ($p < .01$).

Other evidence suggests that, at least among those diagnosable in childhood but not in adulthood, there is no significant link between AD/HD symptoms and antisocial behavior. Mannuzza et al. (1988) drew from a subject pool of 101 males (age 16-23) a group of 52 probands who, although having been diagnosed with hyperactivity in childhood, did not receive a DSM-III (APA, 1980) diagnosis at follow-up. Their purpose was to examine the overall status of grown children diagnosed as hyperactive who did not have a mental disorder in adulthood. The study found that antisocial behaviors (e.g., physical fighting, use of a weapon, illegal income) beyond the age of 18 years were not more prevalent among probands than controls.

Greenfield et al. (1988) conducted a 15 year follow-up which compared 61 hyperactives with 41 controls. From the hyperactive group, two subgroups

were identified. One subgroup (n = 22) had moderate to severe continuing symptoms, while another (n = 39) had mild or no continuing symptoms. The study found that few controls and probands without continuing ADDH symptoms showed any significant antisocial behavior. However, more of the probands with moderate to severe continuing symptoms also had continuing symptoms of antisocial behavior
($p < .001$). Hence, if there exists an increased risk of antisocial acts among adults diagnosed with AD/HD in childhood, the risk may be limited to those adults with more severe continuing symptoms.

Criminality

Recent research suggests a link between childhood AD/HD and later incarceration. Lambert-Eyestone (1991) found that the rate of ADHD in the prison sample studied exceeded the prevalence rate of the general population. Indeed, 25% of the sample showed diagnosable ADHD with symptoms manifested in both childhood and adulthood. This is in contrast to the control group, of which only 3.9% were diagnosable as ADHD ($p < .001$).

Mannuzza et al. (1989) conducted a prospective follow-up study of 103 men (ages 16-23) to determine if ADDH is a predisposing characteristic to antisocial personality disorder and criminality. One-hundred controls were also selected for the study. Subjects were administered the TOYS (derived from the Diagnostic Interview Schedule; Robins et al., 1981) and their parents were administered the PARI (Mannuzza & Klein, 1988). In addition, interviews were conducted by psychologists who gave a DSM-III (APA, 1980) diagnosis. Finally, arrest records were obtained for all offenses committed within New York State. The research showed that significantly more

probands had been arrested ($p < .01$), convicted ($p < .01$), and incarcerated ($p < .001$) than controls. In addition, more probands had been charged with ($p < .01$) and convicted of ($p < .05$) a felony. Finally, more probands than controls had multiple convictions ($p < .01$).

The researchers pointed out, however, that two thirds of probands and controls who had a concurrent antisocial/conduct disorder (ACD) had been arrested. Probands who had an ACD and a history of arrest did not differ significantly from the controls ($p < .63$). When subjects without ACDs were compared, probands and controls did not differ significantly in history of arrest (28% vs. 16%). In addition, none of the 64 probands who did not have an ACD had been incarcerated, while 68% of the 24 probands with an ACD had been imprisoned. Hence, there may be a subgroup of hyperactives who develop an antisocial or conduct disorder, and of this subgroup, a majority have been in trouble with the law.

Pathological Gambling

In addition to antisocial behaviors and incarcerations, a link has been suggested between childhood AD/HD and pathological gambling in adulthood. Carlton et al. (1987) conducted a study to determine if gambling was related to the deficits in impulse control found in ADD. They recruited 14 male pathological gamblers from self-help groups, all of whom had been abstinent for a mean of 9.5 years, and matched them with 16 normal controls. The subjects completed a questionnaire--a modified version of one based on the DSM-III (APA, 1980) criteria for ADD in childhood--on demographics and childhood behavior. Each characteristic on the questionnaire was assigned to one of four categories: (1) primary sign of ADD, (2) associated sign of ADD, (3)

minimally or not related to ADD, or (4) uncertain relationship to ADD. The study revealed that gamblers had higher ratings than controls in the primary ($p \leq .05$), associated ($p \leq .05$), and minimally related ($p \leq .02$) categories. In addition, the gamblers assigned higher ratings to primary than to either associated ($p \leq .02$) or minimally related ($p \leq .02$) signs of ADD, which again differentiated them from control subjects.

In another study, Rugle (1990) attempted to, among other things, determine if a connection existed between a history of childhood ADHD and vulnerability to adult addictive gambling. It was proposed that gamblers would have more childhood behaviors consistent with a diagnosis of ADHD. Thirty-three recovering gamblers (ages 23-62) were compared with 33 non-gambling controls. Among other tests, subjects were given the Self-Control Rating Scale (SCS, Kendall & Wilcox, 1979). They were also given several tests of attentional capacity as well as a questionnaire (given to both the subjects and someone familiar with the subjects' childhood) on childhood symptoms of ADHD. Gamblers achieved significantly higher ratings than non-gamblers on the Self-Control Scale ($p < .005$). The Self-Control Scale focuses on cognitive/behavioral control as opposed to aggressiveness/ conduct disorder. This finding indicates that there may be at least similar symptom histories between pathological gambling and childhood AD/HD symptomology.

In summary, there may be a relationship between childhood AD/HD and adult gambling. Indeed, differences between the childhood characteristics of gamblers and normal controls may relate to overactivity, distractibility, and difficulty inhibiting behavior. However, more research needs to be conducted

in order to make applications in this area. In addition, prospective studies would be important and helpful to more thoroughly understand the relationship between the two disorders.

Psychiatric Disorders

Within the last 10 years, a wide gamut of often contradictory research has been conducted on the suggested link between childhood AD/HD symptoms and adult psychiatric disorders. Some evidence for a greater prevalence of multiple psychiatric diagnoses in adulthood has been found. Other data, although often conflicting, also suggest an increased risk for anxiety disorders and mood disorders. Finally, much evidence has supported a relationship between childhood AD/HD and adult antisocial personality disorder.

Multiple Diagnoses

Research has indicated that there is an increased risk for more than one psychiatric diagnosis (comorbidity) in adults diagnosed with AD/HD symptomology in childhood. For instance, Mannuzza et al. (1991) did a follow-up study comparing hyperactive boys with their brothers and controls. The researchers found that the only diagnosis that significantly distinguished probands from their siblings was ADDH (35% vs. 2%, $p \leq .001$). However, a greater number of probands (30%) than their brothers (6%) and controls (10%) had at least two DSM-III (APA, 1980) diagnoses on follow-up ($p \leq .05$). In the replication of their previous study, Mannuzza et al. (1991) evaluated the prevalence of mental disorders among adults with childhood AD/HD

symptoms at any time after the age of 13. Again, probands showed significantly greater rates of mental illness than controls (83% vs. 44%, $p < .001$). Shekim et al. (1990) reported that only 14% of the patients in their study had a diagnosis of ADHD-RS alone, and most had one to four additional diagnoses. The authors reported that one third of the sample had four additional DSM-III-R (APA, 1987) diagnoses. Further, Gittelman et al. (1985) found that significantly more probands than controls (8% vs. 1%) had psychiatric hospitalizations ($p < .02$).

Anxiety Disorders

Some data suggest a propensity towards anxiety disorders in adults diagnosed with AD/HD in childhood. Biederman et al. (1993) found that adults with ADHD had significantly higher rates of anxiety disorders when compared with adults without ADHD. In particular, the study found that 43% ($p \leq .001$) of referred adults with ADHD and 20% ($p \leq .001$) of non-referred adults with ADHD had a diagnosis of generalized anxiety disorder, (versus only 5% of adult controls). Similar results were obtained by Shekim et al. (1990), who found that 53% of the probands in their study were diagnosed as also having generalized anxiety disorder. Consistent with the above two studies, Gualtieri et al. (1985) found that ADD subjects scored significantly high on self-ratings of anxiety (as measured by the Zung Self-Rating Scales of Depression and Anxiety, $p < 0.0005$).

It should be noted, however, that neither Mannuzza et al. (1991) or Gittelman et al. (1985) found evidence of a relationship between adult anxiety disorders and childhood AD/HD symptomology in their longitudinal studies.

Hence, research in this area tends to be contradictory and needs further clarification.

Mood Disorders

Some data suggest that adults diagnosed with AD/HD symptoms have a greater propensity towards affective disorders. For instance, Shekim et al. (1990) reported that 25% of their probands met the diagnostic criteria for cyclothymia, and 25% for dysthymia. Gualtieri et al. (1985) found that ADD subjects scored significantly high in self-ratings of depression (as measured by the Zung Self-Rating Scales of Depression and Anxiety) ($p < .025$). However, Mannuzza et al. (1991) and Gittelman et al. (1985) found no cases of major depression at the time of follow up and contended that previous research that proposed ADDH to be a predisposer to affective disorder was unsupported. In both of these longitudinal studies no cases of ongoing major depression were found and no significant differences between the rates of lifetime major depression in probands versus controls were reported. In addition, no significant rates of dysthymia or bipolar disorder were found.

While data are conflicting regarding the presence of depression and dysthymia, research does suggest a link between childhood AD/HD and adult suicidality. For instance, Weiss et al. (1985) reported that hyperactives had made significantly more suicide attempts ($p < 0.04$) than controls. Lambert-Eyestone (1991) also found that attempted suicide among a sample of prisoners was related to ADHD. Indeed, while the majority of subjects without ADHD symptoms or with symptoms in childhood but not in adulthood reported never having attempted suicide, the majority of those who showed symptoms of ADHD in childhood but not adulthood reported

having attempted suicide at least once. The study found that the categories of those with ADHD symptoms in childhood (childhood symptoms only, variable symptoms, and symptoms throughout life) made up 82% of all the subjects who had attempted suicide. Hence, evidence seems to suggest a link between AD/HD symptoms and later suicidality.

Antisocial Personality Disorder

Despite the fact that the data are unclear regarding the link between AD/HD symptoms and various adult psychiatric disorders, there appears to be a strong and empirically supported relationship between childhood AD/HD and an adult diagnosis of antisocial personality disorder. Biederman et al. (1993) found that, when compared with an adult group without ADHD, two groups of adults with ADHD in the study had significantly higher rates of antisocial personality disorder (12% [$p \leq .01$] and 18% [$p \leq .001$] vs. 3% of controls). Weiss et al. (1985) also found that probands diagnosed with ADD in childhood had a significantly higher rate than normals of concurrent antisocial/conduct disorder in adulthood (23% vs. 2.4%, $p \leq .01$). Mannuzza et al. (1991) found similar data, with 48% of probands versus 20% of controls being diagnosed with antisocial/conduct disorder ($p \leq .01$). Further, Hechtman and Weiss (1986) found that their clinical ratings and modified SADS criteria (Endicott & Spitzer, 1978), and DSM-III (APA, 1980) criteria demonstrated that hyperactives were found more often than controls to have antisocial personality disorder in adulthood (14 vs. 1, $p < .01$). Similarly, Mannuzza et al. (1993) found that 33% of the probands versus 16% of controls were found to have an ongoing mental disorder ($p \leq .05$), the most prevalent of which was antisocial personality disorder (18% vs. 2% in controls). Indeed,

the odds ratio for this study demonstrated that probands were 9.6 times more likely than controls to have this diagnosis.

Studies have also found differences between antisocial personality disordered controls and antisocial personality disordered probands with a childhood diagnoses of AD/HD symptoms. Gittelman et al. (1985) reported that antisocial disorder was found in 20% of probands ($p < .001$), yet that there were differences among antisocial probands and antisocial controls. Probands with an antisocial disorder had more conflict with teachers (56% vs. 12%, $p < .03$) and had more illegal earnings (69% vs. 17%, $p < .03$) than controls who were diagnosed as antisocial.

Another study researched differences between antisocial personality disordered probands with brothers who also were diagnosed as having antisocial personality disorder. Mannuzza et al. (1991) compared characteristics and severity of antisocial disorder to see if probands were at greater risk than their brothers and controls. Prevalence of specific antisocial behaviors in school, community, and home (e.g., violation of school rules, being expelled) were significantly more common in probands than in their brothers. Other behaviors (truancy, arrests, physical fighting) were more prevalent in probands. No behavior was significantly more prevalent in brothers with antisocial disorder than probands. Probands with an antisocial disorder had more conduct problems than their antisocial brothers ($p < 0.02$) and tended to exhibit more problem behaviors than antisocial controls ($p < 0.10$).

In contrast to the above findings, Cadoret and Stewart (1991) suggested a different link between AD/HD symptomology in childhood and adult

antisocial personality disorder. These researchers investigated the relationships between genetic background, environmental influence, and outcome of ADHD, aggressivity, and antisocial personality disorder. The researchers studied 283 males (ages 18-40) who had been adopted at birth. Diagnoses in adulthood were assigned according to the results of the Diagnostic Interview Schedule (DIS, Robins et al., 1981), as well as information from adoptive parents. Adult diagnoses were made according to DSM-III (APA, 1980) criteria. Log linear modeling revealed that aggressivity and ADHD were significantly correlated ($p < .01$). Aggressivity, but not ADHD, was found to be highly correlated with antisocial personality disorder ($p \leq .0001$). Instead, aggression was seen as the main contributor to the development of antisocial personality disorder in a subgroup of those diagnosed as children. The researchers suggested that if ADHD is related to adult antisocial personality disorder in this subgroup, it is possible that it would be as an indirect result of aggressivity.

In summary, some studies link childhood AD/HD symptoms to multiple psychiatric diagnoses, anxiety disorders, mood disorders, and suicidality. However, the data with regard to these areas appear to be uncertain at this point and more research in this area is necessary to clarify the degree to which AD/HD may predispose one to psychopathology in adulthood. While the relationship between AD/HD and other psychiatric disturbances may be tentative, there does appear to be strong evidence to suggest that AD/HD symptomology in childhood could be a predictor of antisocial personality disorder in adulthood.

Implications for Further Research

Future research should strive to correct many of the methodological problems found in a number of the studies reported in this review. First, the use of clear, consistent definitions of AD/HD across studies is essential. Past longitudinal studies were complicated by the fact that there often was no universal definition of AD/HD at the time of first assessment. In future research, current nomenclature should be adhered to and attempts should be made to use the same construct across research studies in order to increase the ability to compare and make applications from the research data.

Second, increased use of longitudinal studies would be helpful in determining the course of AD/HD across the lifespan. These types of studies tend to have greater reliability than retrospective studies, and perhaps could also explore more thoroughly why it appears that a sub-group of those with childhood AD/HD do not develop difficulties in adulthood, as many others seem to do. Prospective studies could also examine the helpfulness of various treatments of AD/HD in childhood for later adult health. In particular, the use of psychotherapy and medications should be explored and weighed as to which one is associated with the best long-term prognosis.

Third, more attempts should be made to develop and implement standardized testing for use in future research. Further, reliability can be enhanced by the use of the same or similar test measures at the different points of assessment across prospective studies. In addition, instruments with appropriate validity and reliability should be developed and applied to the research. Increased standardization of testing procedures and use of

empirically supported measures can greatly increase comparability of the studies and the confidence with which they can be interpreted.

Future research should also attempt to include more representative samples especially with respect to ethnic and gender related variables. Indeed, although early research has been conducted on AD/HD in females (Faraone, Biederman, Keenan & Tsuang, 1991), this will be an important area for further research in light of the fact that females seem to demonstrate differences in the manifestation of the disorder. In addition, although some early research has been conducted to investigate cultural differences in AD/HD (Holborow & Berry, 1986; Mann et al., 1992), further research would be valuable for a more complete understanding of the role of such differences in the disorder. Both areas of research would have implications for creating representative sampling as well as extending our understanding of cultural and gender differences in AD/HD adults. Finally, future longitudinal studies should attempt to provide more information on AD/HD among older adults. These studies should include data with respect to both middle aged adults senior citizens.

With regard to the scope of research, future studies should also focus on understanding the role of moderator variables that influence AD/HD and specific symptomology. For instance, more understanding should be given to the relationship between AD/HD and antisocial personality disorder. Antisocial personality disorder may account for increased substance abuse as well as antisocial behavior and criminality among adults diagnosed with AD/HD symptomology as children. In addition, more needs to be understood about aggression as a significant link between AD/HD and the development

of antisocial personality disorder. The link between significant childhood aggression and AD/HD with an antisocial/conduct disorder in adulthood may have strong prognostic implications for adult outcome. Hence, future study in this area should focus on detection and treatment of these symptoms in order to promote a better outcome in adulthood.

Conclusion

Research across the last decade seems to indicate that some individuals diagnosed with AD/HD or AD/HD symptoms in childhood continue to experience the full or partial syndrome in adulthood. These individuals appear to experience a continuance of symptoms into adulthood and tend to have lower educational and occupational status. Further, these adults may have an increased risk for alcohol and substance use and abuse, and may engage more frequently in antisocial behavior, criminal acts, and pathological gambling. Finally, although the research is equivocal, these individuals appear to be at greater risk for psychopathology in adulthood. In particular, there seems to be a link between AD/HD in childhood and antisocial personality disorder in adulthood.

Over the last 10 years, many researchers have studied the long-term course of AD/HD and its relationship to lifestyle functioning and psychopathology. In the future, increased emphasis on prevention and treatment in light of the research reviewed needs to take place. Further, assessment devices used in research need to use standardized measures and definitions. Research designs need to better account for and control for moderator variables. Finally, an increased understanding of AD/HD in

females, in ethnic minorities, and in adults in their middle and late years will be an important research endeavor for the future.

In conclusion, it seems apparent that prevention and early treatment intervention need to occur for children with a diagnosis of AD/HD. Prevention may be aimed at limiting the development of a conduct disorder and/or early substance abuse, both of which can lead to significant impairment in later adulthood. Such early intervention may be the key that enables many AD/HD children to live fuller and healthier lives as adults.

REFERENCES

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd ed. rev.). Washington, DC: Author.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th ed.). Washington, DC: Author.

Biederman, J., Faraone, S.V., Spencer, T., Wilens, T., Norman, D., Lapey, K.A., Mick, E., Lehman, B.K., & Doyle, A. (1993). Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with attention deficit hyperactivity disorder. American Journal of Psychiatry, 150(12), 1793-1798.

Cadoret, R.J., & Stewart, M.A. (1991). An adoption study of attention deficit/hyperactivity/aggression and their relationship to adult antisocial personality. Comprehensive Psychiatry, 32(1), 73-82.

Carlton, P.L., Manowitz, P., McBride, H., Nora, R., Swartzburg, M. & Goldstein, L. (1987). Attention deficit disorder and pathological gambling. Journal of Clinical Psychiatry, 48(12), 187-488.

Cox, A., Rutter, M., & Quinton, D. (1977). Bias resulting from missing information: Some epidemiological findings. British Journal of Preventive & Social Medicine, 31, 131-136.

Derogatis, L.R. (1975). The SCL-90. Baltimore, MD: Clinical Psychometrics Research.

Endicott, J., & Spitzer, R.L. (1978). A diagnostic interview: The Schedule for Affective Disorders and Schizophrenia. Archives of General Psychiatry, 35, 837-844.

Endicott, J., Spitzer, R.L., & Fleiss, J. (1976). The Global Assessment Scale: A procedure for measuring overall severity of psychiatric disturbance. Archives of General Psychiatry, 33, 766-771.

Eyre, S.L., Rounsaville, B.J., & Kleber, H.D. (1982). History of childhood hyperactivity in clinic population of opiate addicts. Journal of Nervous and Mental Disease, 170(9), 522-527.

Endicott, J., Spitzer, R.L., & Fleiss, J. (1976). The Global Assessment Scale: A procedure for measuring overall severity of psychiatric disturbance. Archives of General Psychiatry, 33, 766-771.

Eyre, S.L., Rounsaville, B.J., & Kleber, H.D. (1982). History of childhood hyperactivity in clinic population of opiate addicts. Journal of Nervous and Mental Disease, 170(9), 522-527.

Faraone, S.V., Biederman, J., Keenan, K., & Tsuang, M.T. (1991). A family-genetic study of girls with DSM-III attention deficit disorder. American Journal of Psychiatry, 148(1), 112-117.

Gittelman, R., & Mannuzza, S. (1985). Diagnosing ADD-H in adolescents. Psychopharmocology Bulletin, 21, 237-242.

Gittelman, R., Mannuzza, S., Shenker, R., & Bonagura, N. (1985). Hyperactive boys almost grown up: Psychiatric status. Archives of General Psychiatry, 42, 937-947.

Goodwin, D.W., Schulsinger, F., Hermansen, L., Guze, S.B., & Winokur, G. (1975). Alcoholism and the hyperactive child syndrome. Journal of Nervous and Mental Disease, 160(5), 349-353.

Greenfield, B., Hechtman, L., & Weiss, G. (1988). Two subgroups of hyperactives as adults: Correlations of outcome. Canadian Journal of Psychiatry, 33(1), 505-508.

Gualtieri, C.T., Ondrusek, M.G., & Finley, C. (1985). Attention deficit disorders in adults. Clinical Neuropharmacology, 8(4), 343-356.

Halle, M.S., Hesselbrock, M., & Hesselbrock, V. (1982). Childhood deviance and sociopathy in alcoholism. Journal of Psychiatric Treatment and Evaluation, 4, 33-36.

Hechtman, L., Weiss, G., & Perlman, T. (1980). Hyperactives as young adults: Self-esteem and social skills. Canadian Journal of Psychiatry, 25(6), 478-482.

Hechtman, L., & Weiss, G. (1986). Controlled prospective fifteen year follow-up of hyperactives as adults: Non-medical drug and alcohol use and anti-social behavior. Canadian Journal of Psychiatry, 31(6), 557-567.

Holborow, P., & Berry, P. (1986). A multinational, cross-cultural perspective on hyperactivity. American Journal of Orthopsychiatry, 56(2), 320-323.

Hollingshead, A.B. (1975). Four-Factor Index of Social Status. New Haven, CT: Yale University, Department of Sociology.

Hopkins, J. (1979). Cognitive style in adults originally diagnosed as hyperactives. Journal of Child Psychology and Psychiatry, 20, 209-216.

Huessy, H.R., & Howell, D.C. (1985). Relationship between adult alcoholism and childhood behavior problems. Psychiatric Journal of the University of Ottawa, 10(2), 114-119.

Jough, H. (1975). California Psychological Inventory (Revised edition). Palo Alto, CA: Consulting Psychologist Press, 1975.

Klinteberg, B., Magnusson, D., & Schalling, D. (1989). Hyperactive behavior in childhood and adult impulsivity: A longitudinal study of male subjects. Personality and Individual Differences, 10(1), 43-50.

Lambert-Eyestone, L. (1991). An epidemiological study of attention deficit hyperactivity disorder and depression in a male prison population (Doctoral dissertation, Brigham Young University). Dissertation Abstracts International, 52, 3290A.

Mann, E.M., Ikeda, Y., Mueller., C.W., Takahashi, A., Tao, K.T., Humris, E., Li, B.L., & Chin, D. (1992). Cross-cultural differences in rating hyperactive-disruptive behaviors in children. American Journal of Psychiatry, 149(11), 1539-1542.

Mannuzza, S., & Klein, R.G. (1987). Schedule for the Assessment of Conduct, Hyperactivity, Anxiety, Mood, and Psychoactive Substances (CHAMPS). New Hyde Park, NY: Children's Behavior Disorders Clinic, Long Island Jewish Medical Center.

Mannuzza, S., & Klein, R.G. (1988). Modifying the Diagnostic Interview Schedule to study adolescents and young adults. DIS Newsletter, 5, 10-12.

Mannuzza, S., Klein, R.G., & Addalli, K.A. (1991). Young adult mental status of hyperactive boys and their brothers: A prospective follow-up study. Journal of the American Academy of Child and Adolescent Psychiatry, 30(5), 743-751.

Mannuzza, S., Klein, R.G., Bessler, A. Malloy, P. & LaPadula, M. (1993). Adult outcomes of hyperactive boys: Educational achievement, occupational rank, and psychiatric status. Archives of General Psychiatry, 50(70), 565-576.

Mannuzza, S., Klein, R.G., Bonagura, N., Konig, H., & Shenker, R. (1988). Hyperactive boys almost grown up: Status of subjects without a mental disorder. Archives of General Psychiatry, 45,(1) 13-18.

Mannuzza, S., Klein, R.G., Bonagura, N., Malloy, P., Giampino, T.L., & Addalli, K.A. (1991). Hyperactive boys almost grown up: Replication of psychiatry status. Archives of General Psychiatry, 48,(1) 77-84.

Mannuzza, S., Klein, R.G., Konig, P.H., & Giampino, T.L. (1989). Hyperactive boys almost grown up: Criminality and its relationship to psychiatric status. Archives of General Psychiatry, 46, 1073-1979.

Morris, H.H., Escoll, P.J., & Wexler, R. Aggressive behavior disorders of childhood: A follow-up study. American Journal of Psychiatry, 112, 991-997.

Morrison, J.R. (1980). Childhood hyperactivity in an adult psychiatric population: Social factors. Journal of Clinical Psychiatry, 41(2), 40-43.

Murphy, L.L., Conoley, J.C., & Impara, J.C. (Eds.). (1994). Tests in print IV: An index to tests, test reviews, and the literature on specific tests. Lincoln, NE: The University of Nebraska Press.

Orvaschel, H., & Puig-Antich, J. (1987). Schedule for Affective Disorders and Schizophrenia for School-Age Children-Epidemiologic, 4th version. Fort Lauderdale, FL: Nova University Center for Psychological Study.

Robins, L.N., Helzer, J.E., Croughan, J., & Ratcliff, J.S. (1981). The NIMH Diagnostic Interview Schedule: Its history, characteristics, and validity. Archives of General Psychiatry, 38, 381-389.

Rugle, L.J. (1990). Neuropsychological assessment of attention deficit disorder in pathological gamblers (Doctoral dissertation, Kent State University, 1990). Dissertation Abstracts International, 52, 6118A.

Shekim, W.O., Asarnow, R.F., Hess, E., Zaucha, K., & Wheeler, N. (1990). A clinical and demographic profile of a sample of adults of attention deficit hyperactivity disorder, residual state. Comprehensive Psychiatry, 31(5), 416-425.

Spitzer, R.L., Williams, J.B.W., Gibbon, M., & First, M.B. (1990). Structured Clinical Interview for DSM-III-R--Non-Patient Edition. Washington, D.C.: American Psychiatric Press.

Weiss, G., & Hechtman, L. (1986). Hyperactive children grown up. New York: The Guilford Press.

Weiss, G., Hechtman, L., Milroy, T., & Perlman, T. (1985). Psychiatric status of hyperactives as adults: A controlled prospective 15-year follow-up of 63 hyperactive children. Journal of the American Academy of Child Psychiatry, 24(2), 211-220.

Wender, P.H., Reimherr, F.W., & Wood, D.R. (1981). Attention Deficit Disorder ("Minimal Brain Dysfunction") in adults. Archives of General Psychiatry, 38, 449-456.

Wood, D., Wender, P.H., & Reimherr, F.W. (1983). The prevalence of Attention Deficit Disorder, Residual Type, or Minimal Brain Dysfunction, in a population of male alcoholic patients. American Journal of Psychiatry, 140(1), 95-98.

VITA

NAME:

Cheryl L. Stokeld

EDUCATION:

Rosemead School of Psychology Clinical Psychology	Psy.D.	(Cand.)
Rosemead School of Psychology Clinical Psychology	M.A.	1993
Baylor University Psychology	B.A.	1990

INTERNSHIP:

San Bernadino County Department of Mental Health San Bernadino, CA	1995 -	1996

PRACTICA:

Alpha Counseling Services Outpatient Program	1994 -	1995
Inter-Community Alternatives Network Inpatient Program	1993 -	1994
East Whittier Elementary School District		1992

EMPLOYMENT

H.I.S House Homeless Shelter Course Instructor	1994 -	present
Rosemead School of Psychology Teaching Assistant	1992 -	1994
Brookhaven Psychiatric Pavilion Mental Health Technician	1990 -	1991

The University of Michigan
School of Education
Ann Arbor, MI 48109-1259

U.S. DEPARTMENT OF EDUCATION

OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT (OERI)

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

REPRODUCTION RELEASE (Specific Document)

I. DOCUMENT IDENTIFICATION

EC 304117

Title: The Adult Sequelae of a Childhood Diagnosis of Attention-Deficit/Hyperactivity Disorder: A Review of the Literature

Author(s): Cheryl Stoxeld

Corporate Source (if appropriate): _____

Publication Date: _____

II. REPRODUCTION RELEASE

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, Resources in Education (RIE), are usually made available to users in microfiche and paper copy (or microfiche only) and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce the identified document, please CHECK ONE of the options and sign the release below.

CHECK HERE ➧ ☑ Microfiche (4" x 6" film) and paper copy (8½" x 11") reproduction

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

[PERSONAL NAME OR ORGANIZATION AS APPROPRIATE]

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

OR ☐ Microfiche (4" x 6" film) reproduction only

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

[PERSONAL NAME OR ORGANIZATION AS APPROPRIATE]

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Documents will be processed as indicated provided reproduction quality permits. If permission to reproduce is granted, but neither box is checked, documents will be processed in both microfiche and paper copy.

SIGN HERE ➧

"I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce this document as indicated above. Reproduction from the ERIC microfiche by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction of microfiche by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries."

Signature: Cheryl Stoxeld Printed Name: Cheryl Stoxeld

Organization: Dorsey Ld School & Psy. Position: _____

Address: 13295 Via Del Palma #35 Tel. No.: (310) 907-9584

Whittier, CA Zip Code: 90602 Date: 9-19-95

III. DOCUMENT AVAILABILITY INFORMATION (Non-ERIC Source)

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents which cannot be made available through EDRS.)

Publisher/Distributor: _____

Address: _____

Price Per Copy: _____ Quantity Price: _____

IV. REFERRAL TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER

If the right to grant reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

_____

_____